

Fiscal Year:	FY 2013	Task Last Updated:	FY 08/05/2013
PI Name:	Kozłowski, Steve Ph.D.		
Project Title:	Measuring, Monitoring, and Regulating Teamwork for Long Duration Missions		
Division Name:	Physical Sciences		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Behavior and performance		
Joint Agency Name:	TechPort:	Yes	
Human Research Program Elements:	(1) HFBP :Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) Team :Risk of Performance and Behavioral Health Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Comments:	I moved from Michigan State University to the University of South Florida in August 2020.		
Project Type:	ATD (2004)	Solicitation / Funding Source:	00-HEDS-02
Start Date:	08/16/2013	End Date:	08/15/2016
No. of Post Docs:	No. of PhD Degrees:		
No. of PhD Candidates:	No. of Master' Degrees:		
No. of Master's Candidates:	No. of Bachelor's Degrees:		
No. of Bachelor's Candidates:	Monitoring Center: NASA JSC		
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Biswas, Subir (Michigan State University) Chang, Chu-Hsiang (Michigan State University)		
Grant/Contract No.:	NNX13AM77G		
Performance Goal No.:			
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Task Description:	<p>This proposal is for ground-based research: PRD Risk: Risk of Performance Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team. IRP Gap – Team1: Understand the key threats, indicators, and life cycle of the team for autonomous, long duration, and/or distance exploration missions. Collaboration, cohesion, and coordination are essential teamwork processes, especially for long duration space crews that perform in isolated, confined, and extreme (ICE) environments. Teamwork is critical for minimizing errors and enhancing team performance and reflects team adaptation to the rigors of long duration missions. Over 50 years of research documents the contribution of team processes to team effectiveness. Unfortunately, the vast majority of this research is cross-sectional (static). Thus, there is little scientific knowledge regarding how team processes and psycho-social health vary over long durations in ICE conditions, the persistence of disruptive internal and external shocks, and the types of countermeasures that can regulate effective teamwork.</p> <p>The proposed research has three specific aims and deliverables that yield an integrated approach for measuring, monitoring, and regulating teamwork processes and team functioning:</p> <p>(1) Benchmark long duration team functioning in ICE analog environments. This research will use Experience Sampling Methods (daily assessments) to assess team functioning in ICE environments. The goal is to quantify expected variation in key team processes, identify internal and external shocks, and assess dynamic effects on team performance. Such data are essential for developing standards to distinguish normative variation from anomalies indicative of a threat to team functioning which are necessary for triggering countermeasures.</p> <p>(2) Extend engineering development of an unobtrusive monitoring technology (wearable wireless sensor package). The product is to further develop a prototype monitoring technology of teamwork interactions. Initial validation has demonstrated reliability and accuracy sufficient to establish proof of concept. Proposed extensions are designed to (a) add sensing capabilities (swallow monitoring for food intake, stress assessment) and (b) technology development to make the system more robust (packaging, energy efficiency; hardware, algorithms, and software) for out-of-lab field demonstration.</p> <p>(3) Develop teamwork interaction metrics and regulation support systems. The monitoring technology provides continuous data on a range of teamwork processes. Three additional components are required for a countermeasure system. (a) Metrics: Algorithms need to be developed that parse the raw data streams into meaningful measures, then the metrics need to be validated; (b) Data Fusion and Team Regulation Protocols: The multivariate time series metrics need to be fused into a coherent assessment of individual and team functioning. Anomalies, that signal a departure from normative functioning, have to be classified to drive the provision of feedback and/or team regulation interventions; (c) Distributed Networked Dashboard: A system architecture is needed to integrate sensor information and data fusion, direct feedback to maintain good teamwork and, when the system detects an anomaly in team functioning, trigger appropriate feedback and countermeasures to help an individual or the team regulate team processes. Flexible options for distributing and displaying team status assessments and countermeasures need to be provided (e.g., individual team member, dyads, team leader, ground control).</p> <p>These specific aims will contribute to reducing the risk of team performance decrements by characterizing normative and anomalous patterns of team functioning; monitoring team member interactions; and providing regulation support to maintain teamwork and to trigger countermeasures when needed to aid team recovery.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2013.
Bibliography Type:	Description: (Last Updated: 07/05/2023)